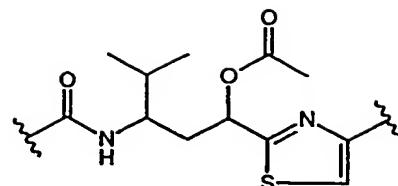
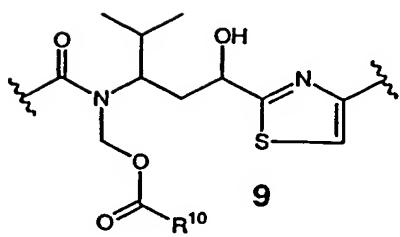
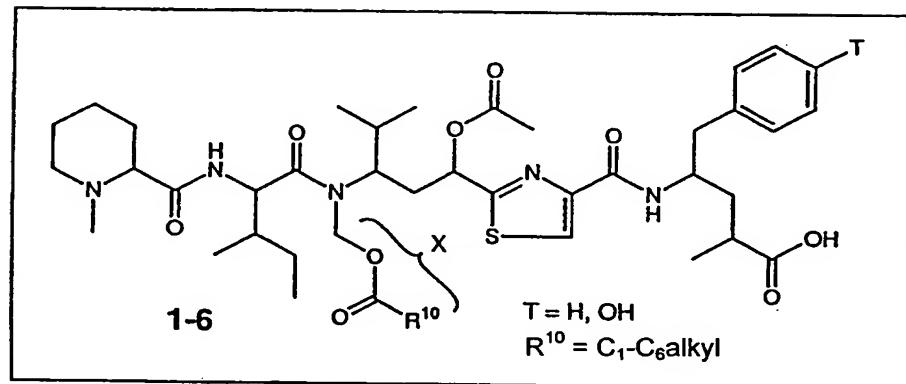


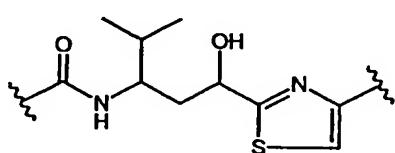
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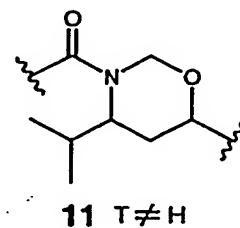
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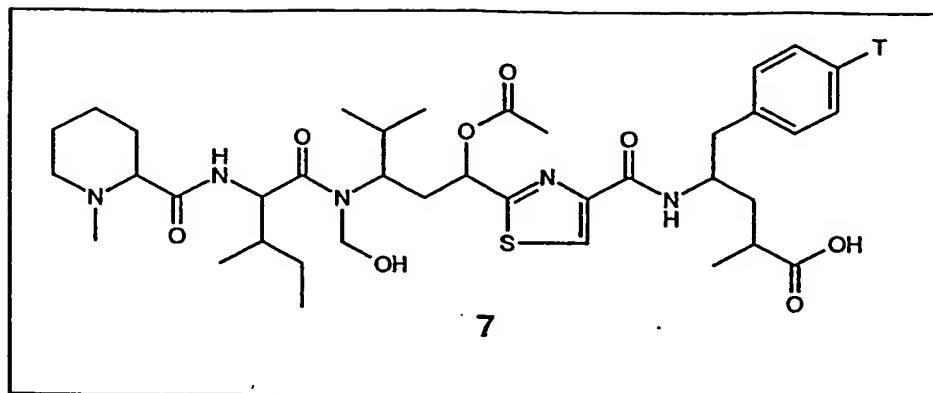
9



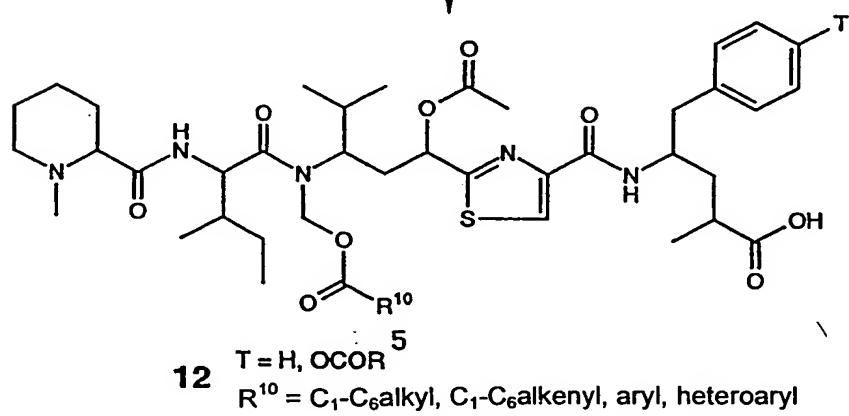
10

11 $T \neq H$

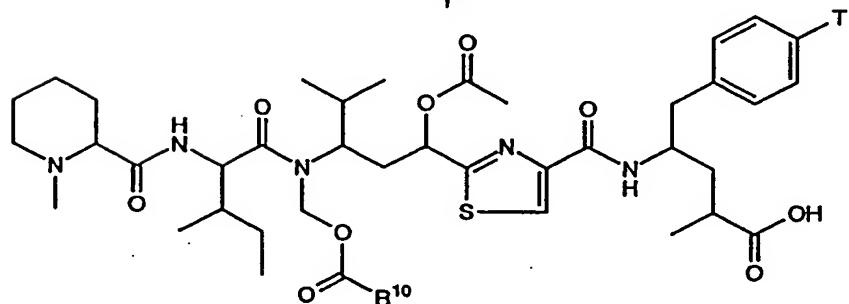
a) 0.1 M HCl, dioxane, 50°C; b) 0.1 M HCl, 100°C; c) NH₃, MeOH; d) 1 M NaOH, MeOH; e) 0.5 M HCl, 100°C



a)

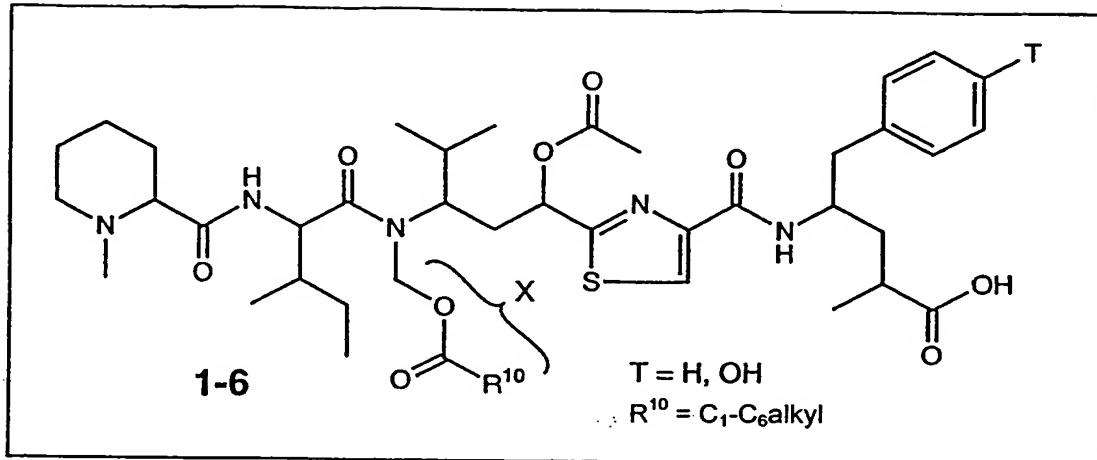


b)

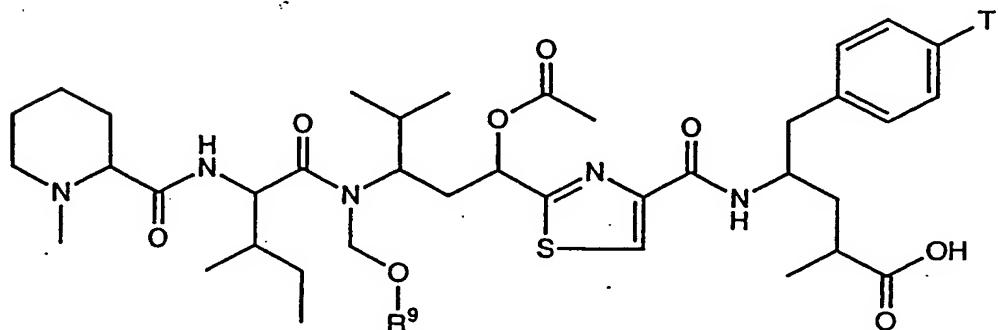


a) $R^{10}COCl, Et_3N$; b) NH_3

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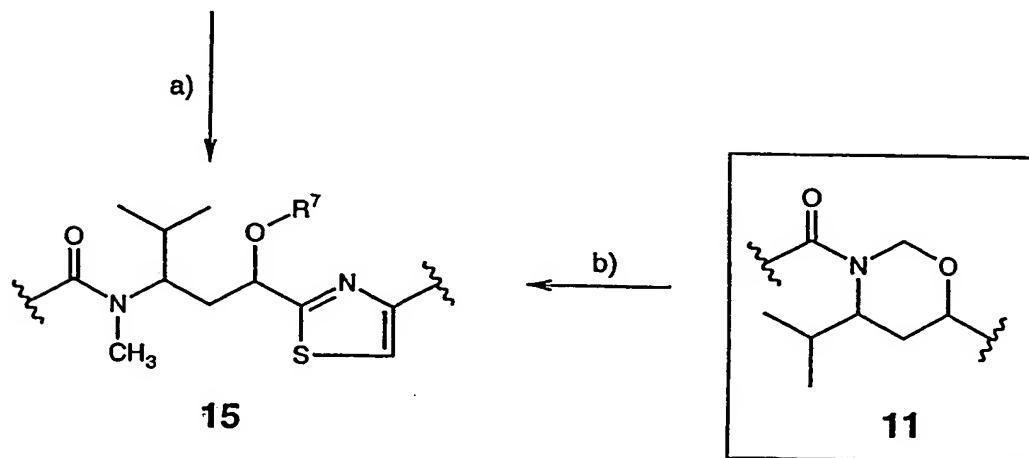
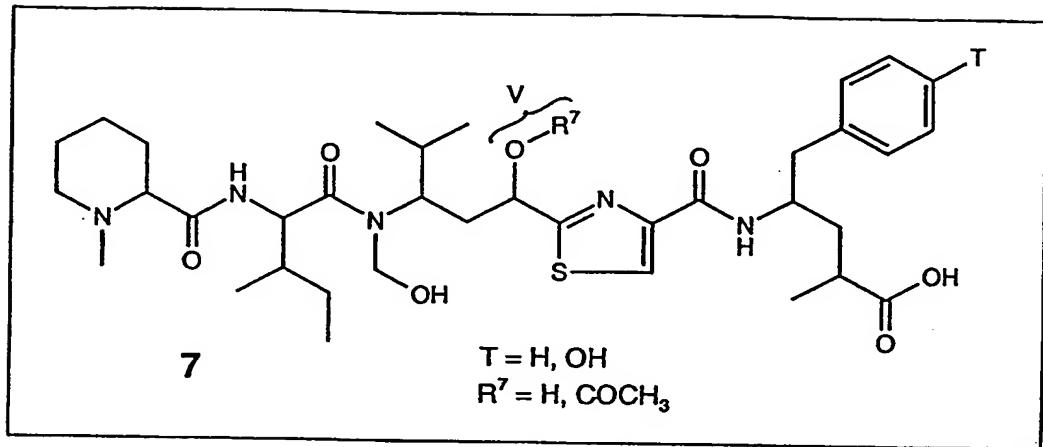
a)



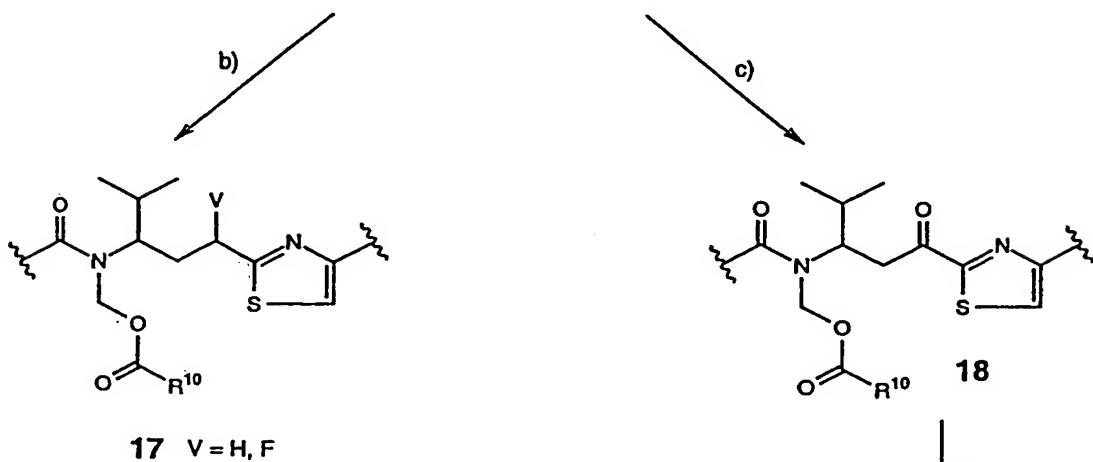
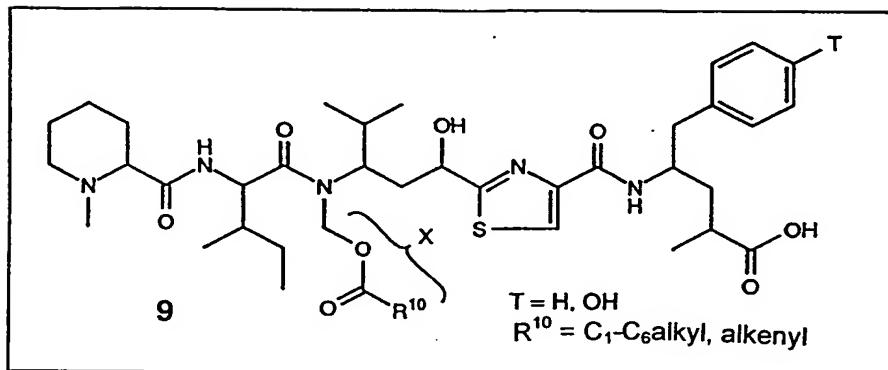
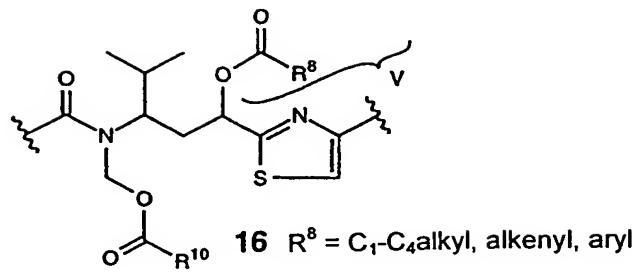
14 $R^9 = C_1-C_4\text{alkyl, alkenyl, aryl}$

a) $p\text{-CH}_3\text{-C}_6\text{H}_4\text{SO}_2\text{OH}$, $R^9\text{OH}$, THF, 80°C

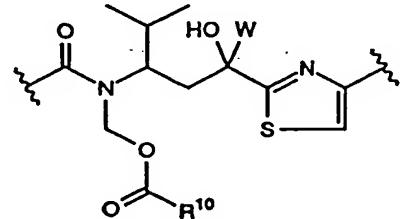
4/9



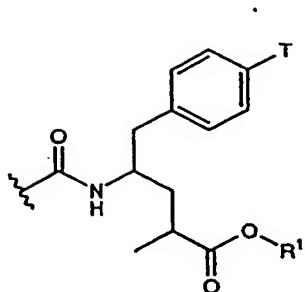
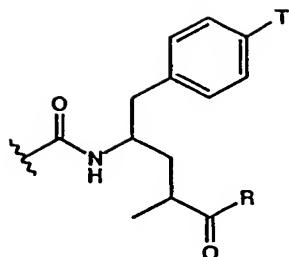
a) $NaCNBH_3$, TFA, MeOH; b) $NaCNBH_3$, Me_3SiCl , CH_3CN



a) R^8COCl , Et_3N , b) Pd/C , H_2 , CH_3COOH or DAST; c) TPAP, NMO; d) $WMgHal$

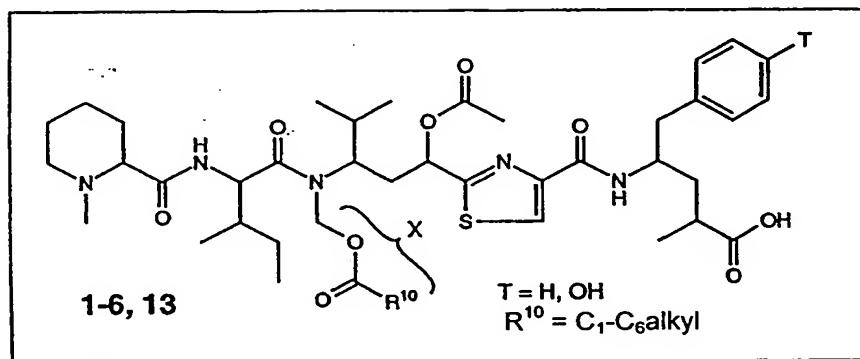


19 W = C₁-C₄alkyl

20 $R^1 = C_1-C_4\text{alkyl, alkenyl}$ 21 $R = NHR^1, NH-NR^1R^2, NHOR^1, NH(CH_2)_{2-4}NR^1R^2$
 $R^1 = H, C_1-C_6\text{alkyl, aryl}$
 $R^2 = H, C_1-C_6\text{alkyl, aryl}$

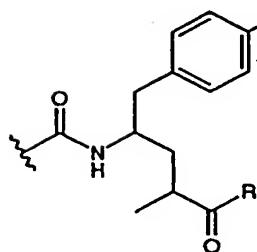
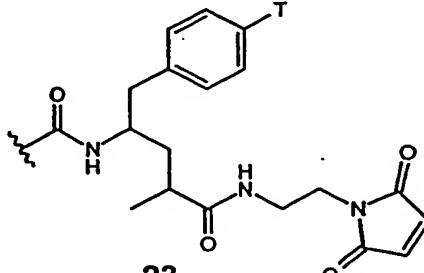
a)

b)

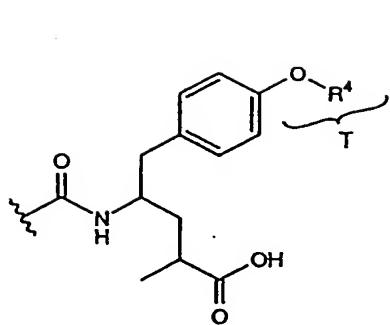


c)

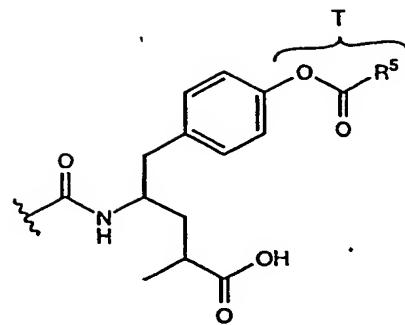
d)

22 $R = C_1-C_4\text{alkyl, alkenyl}$ a) EDC, R^1OH , DMAP, CH_2Cl_2 ; b) EDC, RH, CH_2Cl_2 or isobutyl chloroformate, Et_3N , RH, abs. THFc) RLi; d) EDC, 1-(2-aminoethyl)-pyrrole-2,5-dione, CH_2Cl_2

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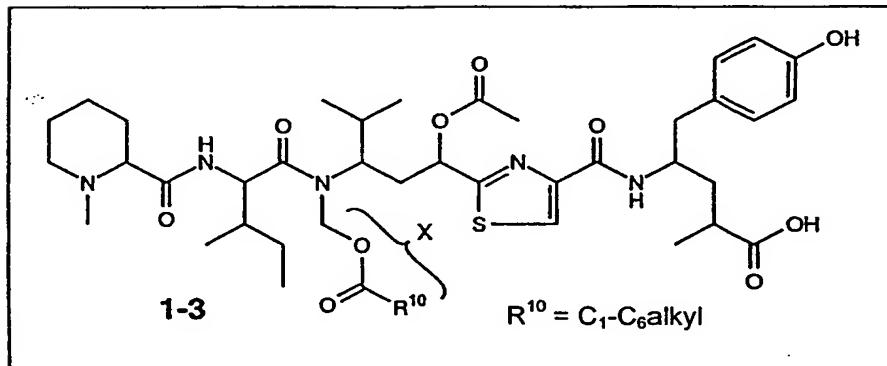
24 $R^4 = P(O)(OR^6)_2, SO_3R^6$
 $R^6 = C_1-C_4$ alkyl, H, metal ions



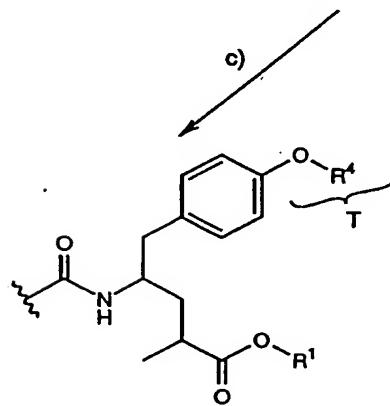
25 $R^5 = C_1-C_4$ alkyl, alkenyl, NR^{12}_2
 $R^{12} =$ alkyl

a)

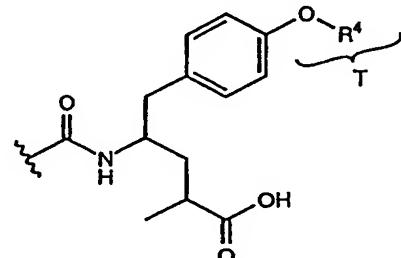
b)



1-3

 $R^{10} = C_1-C_6$ alkyl

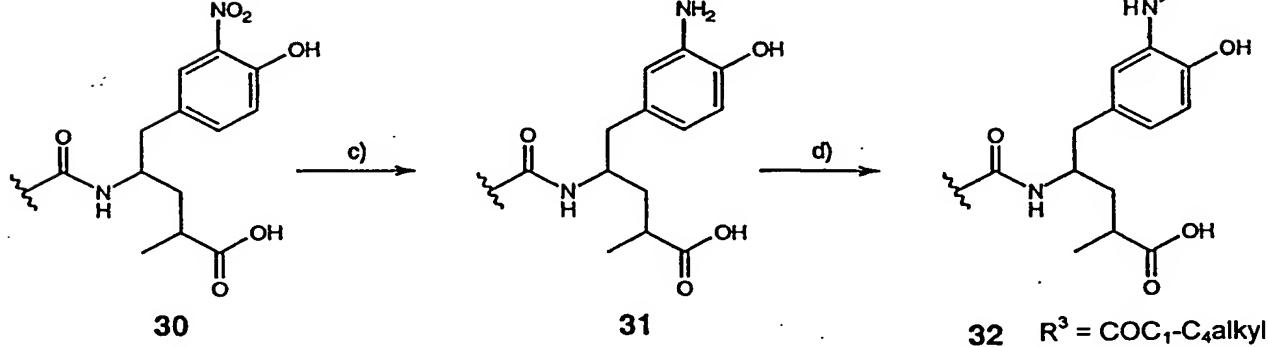
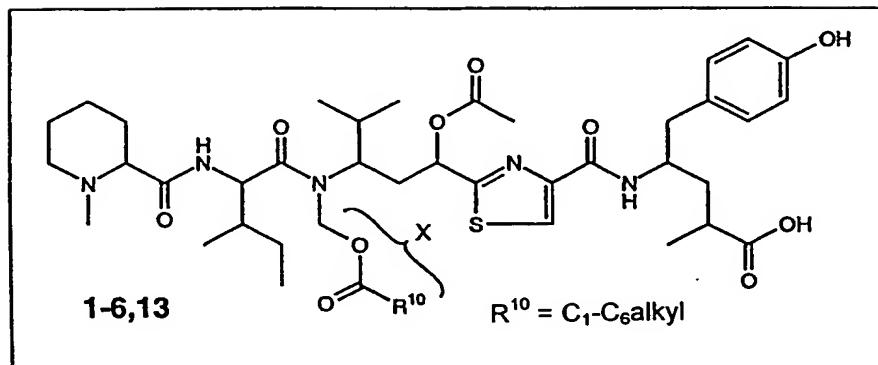
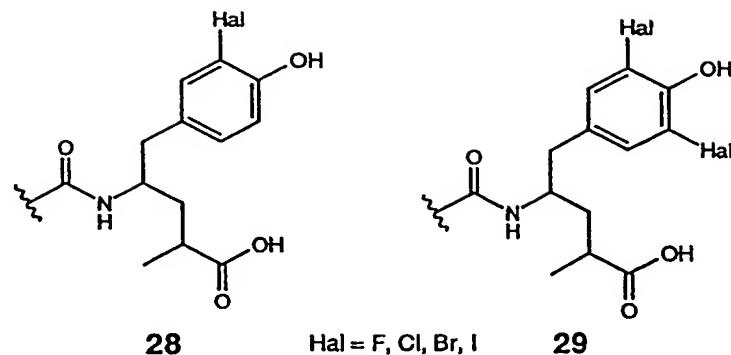
26 $R^1 = R^4 = C_1-C_4$ alkyl, alkenyl

c) $\xrightarrow{\hspace{1cm}}$ 

27 $R^4 = C_1-C_4$ alkyl, alkenyl

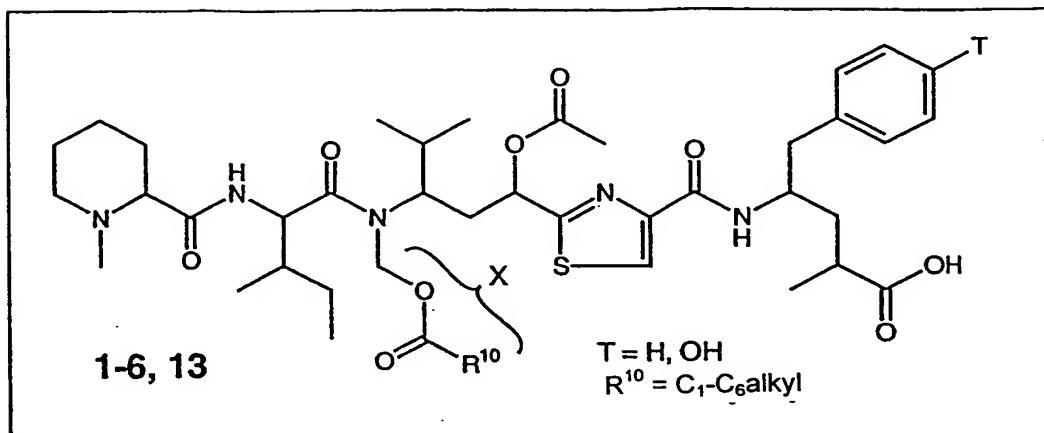
d) $\xrightarrow{\hspace{1cm}}$

a) $P(O)(OR^6)_2OH, I_2$, pyridine, CH_2Cl_2 or pyridine- SO_3 ; b) R^5COCl, Et_3N , abs. THF;
 c) Ag_2O, R^4I, CH_2Cl_2 ; for $R^4 = CH_3$: $CH_2N_2, MeOH$; d) pig liver esterase, KH_2PO_4 buffer, $36^\circ C$;

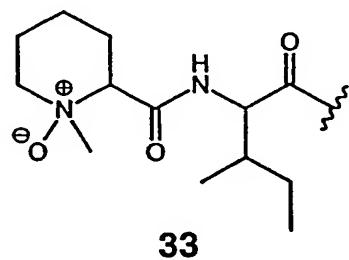


a) $\text{C}_5\text{Cl}_5\text{NF}$ triflate, SO_2Cl_2 , NBS, ICl; b) NaNO_2 , CH_3COOH , EtOH; c) Pd/C, H_2 , EtOH; d) $(\text{R}^3\text{CO})_2\text{O}$

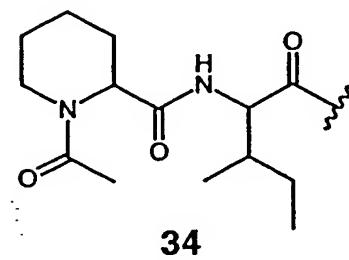
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a)



b)



a) *m*-CPBA, CH_2Cl_2 ; b) Ac_2O , 75°C